DESCRIPTION
The Carrington Research Extension Center conducts research and educational programs to enhance the productivity, competitiveness, and diversity of agriculture in central North Dakota. Research activities include scientists and support staff trained and implementing programs in the disciplines of Agronomy, Plant Pathology, Soil Science, Precision Agriculture and Animal Science. These program teams are able to address a broad scope of factors that impact North Dakota agriculture. The crop diversity of the state is addressed in all program areas and is further supported by the ability to conduct research under both dryland and irrigated conditions. Projects addressing organic crop production and a fruit and berry program broaden the constituency being served. The CREC Foundation seed program represents an important part of the overall NDSU Foundation Seed program. The CREC is the base of operation for four Extension Specialists.

FACILITIES
Of the center’s 1,940 acres, about 1,500 acres is managed as dryland while the remainder is irrigated land. The University owns 840 acres with the remaining 1,100 rented from area landowners. Researchers also conduct off-station crop production field trials near Dazey, Wishek, LaMoure, and Fingal, and operate an expanded research program on irrigated crop production at the Oakes Irrigation Research Site.

Center facilities include the headquarters building, an agronomy laboratory and greenhouse, shop, seed conditioning plant, and seed and equipment storage buildings. The livestock unit can accommodate about 500 head of cattle. It includes a feed mill, feedlot pens, feed and forage storage, animal shelters and an office.

CURRENT EXPERTISE AND FUTURE SIGNIFICANCE
The diversity of expertise that exists among the research staff places the department in a positive position to respond to new research opportunities and emerging challenges that may impact North Dakota agriculture. The CREC staff has years of research experience in fertility, productivity, and quality of the diversity of crops grown across the state and in issues facing livestock producers. Based on the research capacity across multiple disciplines, the CREC strives to implement relevant research impacting current agricultural issues and is prepared to contribute significantly to future opportunities to enhance North Dakota agriculture.

DEPARTMENT IMPACT AND RESPONSE TO BIENNIAL BUDGET ADJUSTMENT
As a result of the 2017 North Dakota Legislative session the CREC’s budget was reduced by 13.5%, a cut similar to other departments across the Agriculture Experiment Station. Due to budget adjustments made within the NDSU Extension Service related to joint CREC staff support, the result was an effective budget reduction at the CREC of 16.3%. A series of adjustments were made to both staffing and operations as a result of the significant budget reduction. Three general-fund positions were eliminated, resulting in the loss of a research technician in the livestock program, a research specialist in agronomy and an assistant who contributed to agronomy and clerical support. An additional grant-based staff position was eliminated with resources redirected to support for remaining positions. Effective staffing was reduced further by accepting partial appointments from three staff members. General fund operating cost reductions have been imposed that primarily impact travel and replacement of durable supplies.
PROGRAM IMPACTS

• Screened several hundred biological seed treatments designed to allow crops to manage environmental stresses, improve nutrient uptake, improve yield and crop quality.
• Significantly advanced our capabilities in using unmanned aerial systems (UAS) to assess producer applications of this new technology for management of weed, fertility, disease and cultural issues.
• Produced and conditioned foundation grade seed of 34 varieties and 11 crops on average the past two years to a diversity of seedsmen and individual farmers.
• Assisted producers in discovering the value and potential of their cattle through two producer consignment feedout programs annually that also provide research projects with necessary cattle.
• Initiated research to evaluate synbiotics as potential alternatives to antibiotics. Positive results would help address public concerns on the use of antimicrobials in livestock production.
• Defined the expected response of corn to different liquid fertilizer application practices made at planting to address phosphorus requirements on soils with very low to medium P levels.
• Investigated strategies to remediate saline soils by evaluating more than 35 species of cover crops and perennial grasses. At present saline soils were only improved by growing specific types of salt-tolerant grasses and alfalfa.
• Initial field studies demonstrated that planting date but not residue cover may be a significant determinant of the severity of Fusarium and Aphanomyces root rots of field pea, with an early planting date critical for strong agronomic performance in fields with root rot pressure.
• Studied the effects of dicamba and glyphosate drift on soybean, field peas and lentils. Through these studies, we’ve been able to identify the doses of each product needed to cause injury to these crops.

CHALLENGES TO SUSTAINING PROGRAMS

Deferred Maintenance
The programs of the CREC are supported by a diversity of facilities that include not only the primary buildings like headquarters and laboratory but also feedlot pens, feed and seed storage, animal shelters, roadways, parking lots, water supply features, storage buildings and waste containment. Current support for maintenance of these facilities is inadequate to address the current deferred maintenance costs that exceed $1 million.

Land Base
A secure land base is critical to sustain the current and future research mission of the Carrington Center. The diverse and broad based programs of the CREC operate on a relatively small land base. The state owns only 840 of the 1,940 acres of land used by the Carrington REC for its current operations. The 1,100 acres not secured by state ownership must be sourced by annual rental agreements from multiple landlords. The heavy reliance on a willing group of land owners to annually rent a major portion of the required CREC land base is risky at best. If any one parcel of land were not made available in a given year, the CREC would be forced to greatly reduce or eliminate program contributions that North Dakota producers expect and are basic to our mission.

FUTURE CAPITAL PROJECTS

Equipment Storage
Additional equipment storage capacity is needed to protect high-value research and farm-scale equipment. A significant amount of the CREC’s high cost and highly technical equipment must currently be stored outdoors and exposed to the elements due to space limitations. The exposure to precipitation, freezing-thawing and sunlight increases repair costs and more quickly reduces the value of the equipment. As an example, the winter storms and major snowfalls of December 2016 resulted in major damage and subsequent repair costs to the various combine headers used in the seed increase program.

Feedlot Facility Enhancement
This facility need has been among the CREC’s capital project priorities for multiple biennia. The need includes a feedlot research support facility, an additional set of feedlot pens, a hoop barn, and related waste containment. The feedlot support facility would include a dispensary, heated storage for feeding equipment, shop and small lab. An additional set of pens would allow the CREC to conduct more feedlot trials and use more treatments or replications within existing studies. A hoop barn would allow research on an alternative beef production system for northern latitudes and expand our capabilities to evaluate environmental issues.